Annual Report to the Joint Minerals, Business, and Economic Development Interim Committee

Municipal Solid Waste Landfill Prioritization, Monitoring, and Remediation

June 2015

WYOMING

Table of Contents

Tables

1.0 Introduction

This report is presented to the Joint Minerals, Business and Economic Development Interim Committee pursuant to Wyoming Statute § 35-11-524 which directed the Wyoming Department of Environmental Quality (Department) to establish a priority list of landfills requiring remediation and to follow-up with annual reports detailing monitoring results, remediation results, assessments of clean-up costs, landfill sites to be addressed in the coming year(s) and orphan landfill site information. This report is the third in the series of annual reports and will provide an update on the status of the Municipal Solid Waste Landfill Remediation Program (LRP).

2.0 Background Information

Subtitle D of the Resource Conservation and Recovery Act (RCRA) was proposed by the U.S. Environmental Protection Agency (EPA) in August of 1988 and became effective in October of 1991, although various implementation deadline extensions ran through 1997. The primary objective of the Subtitle D is waste containment through liner requirements, daily cover, and installation of a final cap. Subtitle D established the minimum landfill management requirements states had to meet. Each state was required to submit plans proving that it met the minimum criteria and Wyoming did so.

Previously, it was believed that the climate in the arid west would prevent the generation of significant quantities of landfill leachate (liquid that has passed through or emerged from solid waste and contains soluble, suspended, or miscible materials removed from such wastes) and the migration of leachate to groundwater. Therefore, landfill design standards in Wyoming and other arid states included provisions whereby landfill operators could demonstrate that liners would not be necessary. For almost 20 years after the promulgation of regulations under Subtitle D, landfills in Wyoming operated without liners.

Regulations promulgated under the authority of Subtitle D require groundwater monitoring at landfills. Over time, groundwater monitoring at Wyoming landfills began to reveal evidence of groundwater contamination, indicating that landfills in Wyoming are generating leachate in quantities sufficient to impact groundwater. The Department and the Wyoming Solid Waste and Recycling Association (WSWRA) realized that pollution and other factors were increasing waste management costs and believed Wyoming needed to investigate ways to minimize those cost increases. The need to address existing groundwater contamination, lining of new landfill units to prevent future contamination, and other factors contributing to rising costs, were brought to the attention of Governor Freudenthal in late 2003. At the Governor's request, the Department formed a Citizens' Advisory Group to study solid waste issues and propose solutions.

Legislation passed in 2006 required the Department to work with landfill operators to install or upgrade monitoring systems that monitor and detect releases of pollutants from landfills. The Department evaluated all available monitoring data submitted as a result of this work and prepared a report in June of 2010, describing the extent to which such facilities cause or contribute to pollution of groundwater. The report included an estimate of $226 million for the statewide groundwater remediation cost obligation faced by local governments. In 2011, the Legislature passed Wyoming Statute § 35-11-524 which required additional investigations to determine the need for landfill monitoring and remediation. The Department was required to establish a priority list of landfills requiring remediation and prepare an initial report by December 2012, describing an assessment of the clean-up costs at the highest priority landfills. In 2013, the Legislature passed Enrolled Act No. 43, which created the LRP. Under the LRP, the Department would oversee and fund up to seventy five percent (75%) of the cost of investigating and remediating contamination at municipal solid waste landfills for up to ten (10) years.

In October of 2013, the Department initiated the rulemaking process to develop regulations to implement the LRP. The Department conducted a robust outreach effort, holding public meetings in Green River, Cody, Gillette, Casper, and Cheyenne, in order to solicit input from the regulated community. The Department presented these regulations to the Wyoming Water and Waste Advisory Board (WWAB) in December of 2013 and to the Environmental Quality Council for final approval in February of 2014. Legislation passed in 2014, required the Legislature to approve a prioritized list of qualified projects prior to the expenditure of funds to conduct remediation activities at high priority landfills. The Priority list was approved in Enrolled Act 2 in the 2015 session clearing the way for remediation activities to begin.

3.0 Landfill Prioritization

112 landfills are included in this landfill assessment. The Department continually evaluates the list to update each facility's priority rank and looks for opportunities to combine facilities to take advantage of efficiencies. Currently, evidence of impacts above groundwater protection standards (GPS) has been detected at 83 (74%) of these landfills. Impacts have not been detected or have been detected below a GPS at 16 (14%) facilities. The Department is awaiting additional information at the remaining 13 (12%) sites in order to determine if there are groundwater impacts at those landfills.

The priority of each facility is determined based on criteria developed by the Department in conjunction with the WWAB. The ranking criteria included the nature and extent of contamination at the facility as well as the proximity to wells, residences, and surface water. An initial priority list was prepared using that ranking criteria for landfills with groundwater

contamination above GPS. The initial ranking considered general site information regarding receptors within a specified radius of each landfill.

A second ranking was then conducted for each facility using more detailed site specific information, including proximity to wells, residences, and surface water downgradient of the landfills. This second ranking identified 11 facilities whose scores were notably higher than succeeding facilities on the list. These 11 were considered to be the "highest priority" and the Department estimated the cost associated with the anticipated remediation for each facility. The Department has divided the priority list into three classifications; highest priority, medium priority, and low priority (Tables 1, 2 and 3 respectively). Additional landfills requiring more information prior to the determination of "impacted" status are shown in Table 4.

This report provides an update to Enrolled Act 2 which resulted in the removal, addition and reprioritization of some facilities based on current groundwater data. The list includes some modifications including the addition of Bridger Valley and Uinta County # 2 and removal of Hartville based on a re-evaluation of the priority list and updated groundwater data.

4.0 Assessment of Remediation Cost Estimates

With regard to the highest priority landfills, after the Department evaluated the remedial option(s) for each facility the potential cost of remediation was then estimated. Costs were primarily estimated through the use of Remedial Action Cost Engineering and Requirements (RACER) software. RACER software is a Windows-based environmental remediation/corrective action cost-estimating system developed under the direction of the U.S. Air Force for estimating environmental investigation and cleanup costs. The RACER software estimates costs for all phases of environmental remediation projects; from site investigation through site closeout. However, RACER lacked some of the options necessary to determine costs to dig & haul waste from a leaking landfill to another lined landfill; therefore the Department generated its own cost estimate methodology for that particular scenario. Capping costs were estimated at $100,000 per acre based on Wyoming information and the Department's research into Financial Assurance requirements in surrounding states.

Except where indicated otherwise, the costs presented below are not engineers' estimates and do not include engineering, permitting and design fees, costs to formally assess potential corrective measures, markups, contingency fees, or the effects of inflation. The Department did not estimate the cost for all remedial options at every facility because a number of options did not appear to be technically or financially feasible, or were not warranted given the scope and/or nature of the contamination. Consistent with past Department reports, the cost estimates in this report are based on remedial systems operating for 20 years. If systems are

operated for shorter or longer periods, costs would change accordingly. The Department will update these numbers as more information becomes available.

Table 1 (below) summarizes the current remediation cost estimates for the highest priority landfills. Cost estimates are based on the remedial actions believed most appropriate at this time. It is important to note that the remedial options and cost estimates contained in this report are preliminary in nature. More accurate cost estimates can only be obtained after investigations have been conducted at each landfill site to understand the nature and extent of contamination, an evaluation of potential remedial actions, and the selection of the remedy determined to be most appropriate.

Table 1 – Remedial Action Summary
Highest Priority Landfills

Landfill	Landfill Rank	Potential Remedial Actions	Estimated Cost of Construction, Operation and Monitoring First 10 Years	Estimated Cost Second 10 Years	Facility Total
*Campbell County - Balefill #1	1	Capping, Gas System,Monitoring, (Soil Sampling)	$11,240,000	$1,700,000	$12,940,000
Sheridan #2	2	Monitoring, Gas System	$517,387	$369,795	$887,182
Casper Balefill	3	Monitoring, Gas System, Cut-off Wall w/ Pump & Treat	$3,433,258	$426,082	$3,859,340
Evanston #1	4	Monitoring, Gas System, Pump & Treat	$1,275,224	$587,040	$1,862,264
Sheridan #1	5	Monitoring, Gas System, Cut-off Wall w/ Permeable Treatment Barrier	$1,783,604	$405,765	$2,189,369
Guernsey	6	Capping, Gas System, Monitoring	$2,769,396	$349,339	$3,118,735

Table 1 – Remedial Action Summary Highest Priority Landfills					
Landfill	**Landfill Rank**	**Potential Remedial Actions**	**Estimated Cost of Construction, Operation and Monitoring First 10 Years**	**Estimated Cost Second 10 Years**	**Facility Total**
Newcastle #1	7	Cut-off Wall W/ Pump & Treat, Monitoring	$1,338,487	$308,844	$1,647,331
Buffalo #1	8	Capping, Monitoring	$2,335,109	$516,495	$2,851,604
Cheyenne	9	Capping, Gas System, Monitoring	$8,631,859	$911,865	$9,543,724
Riverton #1	10	Pump & Treat, Monitoring	$863,301	$681,696	$1,544,997
*Campbell County #2	11	Capping, Gas System, Monitoring	$3,820,000	$700,000	$4,520,000
		Total	$38,007,625	$6,428,681	
Estimated Total Cost for the Highest Priority Landfills (Ranked 1-11) Over 20 Years					**$44,436,306**

*Preliminary Engineer's Estimate.

Table 2 (below) identifies the medium priority landfills. These landfills are those where contaminant concentrations exceed GPS, but the priority ranking scores did not elevate them into the high priority status. Anticipated remedial activities and estimated costs for medium priority landfills have not been provided due to the uncertainty associated with the costs and the likelihood that the costs will change by the time these projects are eligible to receive funding.

Table 2 – Medium Priority Landfills Landfills Ranked 12-49	
Landfill	**Priority Rank**
Lusk	12
Clearmont #2	13
Douglas	14
Glenrock #1	15
Rawlins	16

Table 2 – Medium Priority Landfills Landfills Ranked 12-49	
Landfill	**Priority Rank**
Lincoln Co. - Thayne	17
Buffalo, Old Dump	18
Big Piney #2	19
Pine Bluffs	20
Fremont Co. SWDD – Lander	21
Thermopolis	22
Park County – Cody	23
Horsethief Canyon #2	24
Baggs SWDD	25
Rock River #1	26
Torrington #1	27
Sundance	28
Elk Mountain	29
Medicine Bow	30
Sublette Co. - Marbleton #2	31
Park County – Meeteetse	32
Sinclair #2	33
Laramie Landfill	34
Park County – Kysar	35
Reliance, SWDD 1	36
Eden Valley SWDD	37
Encampment	38
Saratoga, Old Community Dump	39
Bridger Valley	40
Sweetwater Co. SWDD #1 - Point of Rocks	41
High Country Joint Powers Board - Hanna	42
Hanna (Old Site)	43
Hulett #1	44
Bairoil # 1	45
Bairoil #2	46
Big Horn County - North #1	47

Table 2 – Medium Priority Landfills Landfills Ranked 12-49	
Landfill	**Priority Rank**
Rock River #2	48
Big Horn County – South	49

Table 3 (below) identifies the low priority landfills. These landfills are those where contaminant concentrations exceed GPS, but the priority ranking scores did not elevate them to medium priority status. Anticipated remedial activities and estimated costs for low priority landfills have not been provided due to the uncertainty associated with the costs and likelihood that those costs will change by the time these projects are in line to receive funding.

Table 3 – Low Priority Landfills Landfills Ranked 50-84	
Landfill	**Priority Rank**
Sweetwater Co. SWDD #1 – Rock Springs	50
Park County – Powell	51
Big Piney #1	52
Hyattville Landfill	53
Superior	54
Saratoga	55
Park County - Clark #1	56
Big Horn County - North #2	57
Lincoln County - Kemmerer #1	58
Torrington #2	59
Moorcroft #2	60
Newcastle #2	61
Manville #1	62
Ten Sleep SWDD #1	63
Kaycee	64
Uinta County - Evanston #2	65
Washakie Co. SWDD - Worland #1, #2	66
Fremont Co. SWDD - Shoshoni	67
Chugwater	68
Lincoln County - Kemmerer #2	69

Table 3 – Low Priority Landfills Landfills Ranked 50-84	
Landfill	**Priority Rank**
LaGrange	70
Park County - Clark #2	71
Central Weston Co. SWDD, Osage	72
Moorcroft #1	73
Bosler	74
Natrona County Parks - Alcova Landfill	75
Wheatland #2	76
Green River (old) #1, #2	77
Glendo #1	78
Glendo #2	79
Sweetwater Co. SWDD - Wamsutter #2	80
Eastern Laramie Co. SWDD	81
Natrona County Parks - Alcova #2	82
LaBarge	83

Table 4 (below) contains the list of landfills where additional information is needed in order to determine whether they require remediation. As additional information is submitted and processed, the facility would either be placed on the appropriate list or dropped from this report.

Table 4 – Need More Information Landfills	
Landfill	**Status**
Cokeville # 1	Closed
Emblem Burlington	Closed
Lingle Municipal	Closed
Park County - Cody (Old Site)	Closed
Sundance, Old Dump	Historic
Upton #4	Open
Boulder	Historic
Daniel Junction	Historic
Fremont Co. SWDD - Dubois	Open
Fremont Co. SWDD – Little Sand Draw	Open
Midwest-Edgerton #1	Closed

Table 4 – Need More Information Landfills	
Landfill	**Status**
Midwest-Edgerton #2	Open
Pinedale #2	Closed
Total	**13**

5.0 Landfill Monitoring and Remediation

The need for groundwater monitoring at landfills is both a regulatory requirement and a measure needed to protect human health and the environment. Groundwater monitoring helps ensure that the nature and extent of contamination are understood and that potential threats to human health and the environment can be addressed. This is especially important as development in Wyoming encroaches upon landfill sites.

Remediation requirements are based upon site specific factors such as, groundwater quality and characteristics, and proximity to wells and other receptors that may be affected by the contamination. Remedy selection determinations also take into consideration the nature (severity and type of contaminants) and extent (horizontal and vertical) of contamination. In consideration of these factors, the remedy or remedies selected for an individual landfill can be tailored to the specific conditions at the landfill. Remedies can range from relatively passive measures, such as caps and monitoring, to more aggressive measures such as systems that pump contaminated groundwater to the surface for treatment.

To date, while no funds have been expended under the LRP, the Department has begun negotiations for entry into the Program with the three highest priority facilities; Campbell County, City of Sheridan, and City of Casper.

6.0 Landfill Remediation Account – Reimbursement Credit

Legislation passed in 2013 (Wyoming Statute § 35-11-535(c)) allows for qualified entities to receive a credit of 75% for remediation activities that occurred between July 1, 2006 and December 31, 2012. Legislation enacted during the 2015 session (Enrolled Act No. 37) removed the end date to include all remediation activities that occur prior to entry into the LRP. The Department will apply an entity's eligible credit to the payment of remediation costs until such time as the entity's credit is exhausted. At that point, facilities will be responsible for their 25% share of remediation costs.

In early 2014, the Department corresponded with eligible facilities that may have already conducted remediation activities, asking them to submit information regarding the amounts of

money, if any, spent on remediation that they believed was eligible for credit. Submittals have been received for the Casper Balefill, Campbell County Landfills #1 and #2, Sheridan Landfills #1 and #2, Lusk, Wamsutter, Thayne and Riverton. The Department reviewed the submittals and requested follow-up documentation that included invoicing for work conducted and proof-of-payment to ensure eligibility prior to award of credit. Review of this information is ongoing. Finalized credit numbers will not be known until follow-up information/documentation requested of applicants has been received and reviewed.

7.0 Summary

At this time, the Department anticipates remediation will be necessary at 83 landfills in Wyoming. Impacts have not been detected or have been detected below a GPS at 16 facilities. The Department is awaiting additional information at the remaining 13 sites in order to determine if there are groundwater impacts that would require action at those landfills. The current, cumulative remediation cost estimate for the 11 highest priority landfills is $44,436,306. The Department expects annual revisions to this estimate once the entities that have entered the LRP begin conducting work. Due to the uncertainties in estimating remediation costs years into the future and a lack of site specific information, the Department has not estimated costs for medium and low priority landfills at this time. The Department will update this information when more accurate data becomes available.

Progress continues with Campbell County, City of Sheridan, and City of Casper on completing written agreements necessary for entry into the LRP. Once these agreements are executed, entry into the LRP is complete and remediation activities can commence at these sites.

This report will be updated annually to reflect remediation work completed at facilities. Additional adjustments to the lists will be made based on the Department's receipt of groundwater monitoring data and other information gathered for the purpose of ranking landfills in the LRP.